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REMARKS/ARGUMENT

The specification and claims are being amended to improve their form without changing or narrowing the invention disclosed or claimed.

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as First Class Mail in an envelope addressed to: Asst. Commissioner for Patents, Washington, D.C. 20231, on March 18, 2002:

James A. Finder
Name of applicant, assignee or Registered Representative

Signature

March 18, 2002
Date of Signature

Respectfully submitted,

James A. Finder
Registration No.: 30,173
OSTROLENK, FABER, GERB & SOFFEN, LLP
1180 Avenue of the Americas
New York, New York 10036-8403
Telephone: (212) 382-0700

JAF:mcm

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APPENDIX A

“CLEAN” VERSION OF EACH PARAGRAPH/SECTION/CLAIM
37 C.F.R. § 1.121(b)(ii) AND (c)(i)

SPECIFICATION:

Paragraph at page 6, line 12 to page 6, line 13:

a1 Fig. 10A to 10D are sectional views of the dielectric waveguide at different manufacturing steps according to the sixth embodiment.

Paragraph at page 11, line 8 to page 11, line 9:

a2 Figs. 10A to 10D are sectional views of the dielectric waveguide at different manufacturing steps. , 10B, 10C,

Paragraph at page 12, line 8 to page 12, line 12:

a3 According to the construction, the array of through holes 4 equivalently forms walls of the waveguide, so that electromagnetic waves propagate in a mode equivalent to TE10 mode with the two opposite side surfaces of the protruding portion 2 as H planes and the top surface of the protruding portion 2 and the bottom surface of the dielectric substrate 1 as E planes.

Paragraph at page 12, line 13 to page 12, line 20:

a4 Furthermore, because the dielectric constant of the dielectric material forming the protruding portion 2 is larger than that of the dielectric substrate 1, the height of the dielectric waveguide can be reduced compared with a case where the protruding portion 2 is formed of a dielectric material having the same dielectric constant as that of dielectric substrate 1. Furthermore, because the electric field and the magnetic field concentrate on the protruding portion 2, radiation from the through holes 4 in the dielectric substrate 1 can be reduced. Accordingly, a dielectric substrate with small loss and small size can be implemented.

Paragraph at page 13, line 12 to page 13, line 15:

Then, only the dielectric sheets 110 having a larger dielectric constant are cut to a predetermined width, for example, by sandblasting, so that the continuous protruding portion 2 is formed, whereby a convex section as shown in Fig. 10B is formed.

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Paragraph at page 14, line 3 to page 14, line 6:

As described above, the dielectric waveguide is formed simply by laminating and cutting the dielectric sheets and forming the electrodes. Thus, the dielectric waveguide can be readily manufactured simply by using processes for manufacturing ordinary laminated substrates.

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Paragraph at page 15, line 24 to page 16, line 17:

Fig. 12

On the top surface of the dielectric plate 1 as viewed in the figure, a voltage-controlled oscillator (VCO) is connected to a coplanar line 10. The coplanar line 10 is coupled to the transmission line indicated by G1. Between the transmission lines G1 and G2, an amplifier circuit (AMP) implemented by an FET is provided. Furthermore, at an end of the transmission line G3, a slot antenna is formed, so that a transmission signal is radiated from the slot antenna in the direction perpendicular to the dielectric plate 1. The adjacent portions of the transmission lines G2 and G5 constitute a directional coupler. A signal which is distributed by the directional coupler is coupled as a local signal to a coplanar line 12 which is connected to one of the diodes of a mixer circuit. Furthermore, a circulator is formed at the Y-branched center of the transmission lines G2, G3, and G4. The circulator is constructed of a resonator implemented by a disk-shaped ferrite plate and a permanent magnet applying a static magnetic field to the ferrite plate in the perpendicular direction, which are not shown in Figs. 9A and 9B. ? Via the circulator, a reception signal from the slot antenna is coupled to a coplanar line 14 which is connected to the other diode of the mixer circuit. The two diodes of the mixer circuit operate as a balanced mixer circuit, and the output thereof is fed to an external circuit via a balanced line 16 having matching passive components in the middle thereof.

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CLAIMS:

AMENDED 2. A transmission line assembly according to Claim 1, wherein the dielectric constant of the protruding portion is larger than that of the rest of the dielectric plate.

AMENDED 3. A transmission line assembly according to Claim 1, wherein the dielectric constant of the protruding portion and a region on the dielectric plate surrounded by the plurality of through holes is larger than that of the rest of the dielectric plate.

APPENDIX B

VERSION WITH MARKINGS TO SHOW CHANGES MADE
37 C.F.R. § 1.121(b)(iii) AND (c)(ii)

SPECIFICATION:

Paragraph at page 6, line 12 to page 6, line 13:

Fig. 10A to 10D are sectional views of the dielectric waveguide [in] at different manufacturing steps according to [a] the sixth embodiment.

Paragraph at page 11, line 8 to page 11, line 9:

Figs. 10A to 10D are sectional views of the dielectric waveguide [in] at different manufacturing steps.

Paragraph at page 12, line 8 to page 12, line 12:

According to the construction, the [plurality] array of through holes 4 [in array] equivalently forms walls of the waveguide, so that electromagnetic waves propagate in a mode equivalent to TE10 mode with the two opposite side surfaces of the protruding portion 2 as H planes and the top surface of the protruding portion 2 and the bottom surface of the dielectric substrate 1 as E planes.

Paragraph at page 12, line 13 to page 12, line 20:

Furthermore, because the dielectric constant of the dielectric material forming the protruding portion 2 is larger than that of the dielectric substrate 1, the height of the dielectric waveguide can be reduced compared with a case where the protruding portion 2 is formed of a dielectric material having the same dielectric constant as that of dielectric substrate 1. Furthermore, because the electric field and the magnetic field concentrate on the protruding portion 2, radiation from the through holes 4 in the dielectric substrate 1 can be reduced. Accordingly, a dielectric substrate with small loss and small [in] size can be implemented.

Paragraph at page 13, line 12 to page 13, line 15:

Then, only the dielectric sheets 110 having a larger dielectric constant [is] are cut to a predetermined width, for example, by sandblasting, so that the continuous protruding portion 2 is formed, whereby a convex section as shown in Fig. 10B is formed.

Paragraph at page 14, line 3 to page 14, line 6:

As described above, the dielectric waveguide is formed [only] simply by laminating and cutting the dielectric sheets and forming the electrodes. Thus, the dielectric waveguide can be readily manufactured [only by] simply by using processes for manufacturing ordinary laminated substrates.

Paragraph at page 15, line 24 to page 16, line 17:

On the top surface of the dielectric plate 1 as viewed in the figure, a voltage-controlled oscillator (VCO) is connected to a coplanar line 10. The coplanar line 10 is coupled to the transmission line indicated by G1. Between the transmission lines G1 and G2, an amplifier circuit (AMP) implemented by an FET is provided. Furthermore, at an end of the transmission line G3, a slot antenna is formed, so that a transmission signal is radiated from the slot antenna in the direction perpendicular to the dielectric plate 1. The adjacent portions of the transmission lines G2 and G5 constitute a directional coupler. A signal which is distributed by the directional coupler is coupled as a local signal to a coplanar line 12 which is connected to one of the diodes of a mixer circuit. Furthermore, a circulator is formed at the Y-branched center of the transmission lines G2, G3, and G4. The circulator is constructed of a resonator implemented by a disk-shaped ferrite plate and a permanent magnet applying a static magnetic field to the ferrite plate in the perpendicular direction, which are not shown in [Fig. 9] Figs. 9A and 9B. Via the circulator, a reception signal from the slot antenna is coupled to a coplanar line 14 which is connected to the other diode of the mixer circuit. The two diodes of the mixer circuit operate as a balanced mixer circuit, and the output thereof is fed to an external circuit via a balanced line 16 having matching passive components in the middle.

CLAIMS:

AMENDED 2. A transmission line assembly according to Claim 1, wherein the dielectric constant of the protruding portion is larger than that of the rest [part] of the dielectric plate.

AMENDED 3. A transmission line assembly according to Claim 1, wherein the dielectric constant of the protruding portion and a region on the dielectric plate surrounded by the plurality of through holes is larger than that of the rest [part] of the dielectric plate.